



Contact details

Forewind Limited  
Davidson House  
Forbury Square  
Reading RG1 3EU  
United Kingdom

[info@forewind.co.uk](mailto:info@forewind.co.uk)  
[www.forewind.co.uk](http://www.forewind.co.uk)



Annual Review July 2012

# Developing momentum in Dogger Bank

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## Introduction

Forewind is a consortium comprising four leading international energy companies – RWE, SSE, Statkraft and Statoil – which joined forces to bid as part of The Crown Estate's third leasing round for UK offshore wind farms (Round 3).

Each of the four owners recognised that by working together they could make a significant contribution to the future of wind energy in the UK and demonstrate their commitment to the continuing development of the offshore wind industry.

Successful in winning the rights to develop the largest of the Round 3 zones – Dogger Bank – Forewind is committed to securing all the necessary consents required for its development and construction, the first of which is anticipated around 2015. The Forewind team comprises around 30 full-time employees seconded from the owner companies as well as numerous consultants and advisers.

This is the second Annual Review and covers the progress Forewind has made towards its goals in the period from April 2011 until May 2012.





### Chairman's Report

Despite the weather, Forewind has made good progress this year in delivering Britain's most exciting offshore wind resource. We are all very conscious of the importance of this enterprise in supplying Britain's future energy needs and our programme has demanded a great deal from our staff and our partners. They have delivered to the full.

We have worked closely with The Crown Estate in ensuring that we maintain the momentum while still being able to deal flexibly with the wide range of issues that working at sea in these circumstances is bound to involve. With them and our four owners we have created a great team.

We continue to lead the industry in our attention to safety and our insistence that our high standards are shared by all with whom we work. We have encouraged innovation and this has paid real dividends, not least in the simplification of our meteorological mast construction which can now be placed in position more surely and with less danger to those involved. The cooperation of the workforce at Harland and Wolff has been an essential element in this achievement.

Forewind has also worked closely and effectively with National Grid to establish the connection programme so essential to our success. In presenting our plans to the communities where these connections will be made, we have been welcomed by both officials and elected leaders. It is a valuable bonus for us to find such widespread support.

The same determination to ensure the success of our enterprise has been displayed by the JNCC – the body charged with protecting the environment in which we work. It is carrying out its statutory duties in an exemplary way – properly tough in protection but encouraging and flexible in implementation. We share the JNCC's determination to deliver offshore wind energy with the least possible disturbance to the natural environment.

Forewind has now forged the all-important alliances and partnerships which will enable us to make the Dogger Bank an outstanding exemplar of cooperative enterprise and innovation. It is a great privilege to help bring these elements together and to maintain them in so fruitful a way.

**The Rt Hon. John Gummer,  
Lord Deben  
Chairman**



### General Manager's Report

Forewind was set up to lead the development of one of the largest renewable energy projects in the world. Our business is to secure all of the necessary planning permissions for Dogger Bank wind farms. Our expertise is taking projects through all the early stages of development – such as securing land, environmental studies and consents.

At Forewind, we recognise that the economic climate is difficult, but despite that pressure, our shareholders continue to invest in Dogger Bank. Our response has been to make sure that we operate cost effectively – delivering value along every step of the development path, and wherever possible leveraging the skills and expertise in our four parent companies.

The Forewind team has moved from designing surveys and collecting data, to synthesising that work and drawing conclusions. We are well advanced with the first 2GW of safe, viable offshore wind farm capacity. In parallel we have begun consulting on the next projects, with connections already secured for a total of over 7GW of offshore capacity.

Offshore the quantity and quality of the data Forewind has gathered is astonishing – a massive investment that we believe will secure high-quality projects capable of reaching financial close. We have completed the first phase of ornithology and marine ecology surveying, in what has been the largest survey of its type realised anywhere in the world. Our geological modelling is taking shape; the result of geotechnical, geophysical and bathymetric surveying.

Our knowledge of the meteorological and oceanographic conditions has developed through the use of monitoring buoys and, more recently, through the use of a LIDAR installed on the Cavendish gas platform, courtesy of one of the consortium partners. And later this year we plan to install two innovative meteorological masts, pioneering technology that could ultimately be used for wind turbine foundations.

Data collection offshore has involved the work of many marine contractors working on our behalf. Forewind has built a reputation for meeting the challenges posed by developing this large complex project by conducting business in an open and responsible manner. We are committed to operating safely and have taken a lead in encouraging safe behaviours for all those working on our project and communicating experience to the broader industry.

Onshore we have carefully planned and selected a cable route in East Yorkshire, from landfall to the grid connection infrastructure. We have completed onshore ecological surveys and greatly appreciate the cooperation of land owners along the route. Forewind has worked closely with representatives from the community in Cottingham to select the best location for converter stations. A similar process has begun in Teesside for the next group of projects and the public exhibitions this spring were an important milestone.

If all goes to plan, the coming year will see us make our first submissions for development consent. Our staff at all levels, with the support of our Chairman, Directors, and Advisory Committee, show tremendous skill, application and dedication. I'm hugely proud of what everyone at Forewind has already achieved and I am looking forward to delivering the next stage.

The UK is a world leader in offshore wind, but the future will depend in part on Government energy policy and partly on cost reductions. Forewind is playing its part by making sure that we plan and consent the most viable projects we can for Dogger Bank. I am confident that we have given these projects the best possible start; projects that will play an important part in a sustainable energy future for Britain.

On behalf of the management team, I would like to thank our shareholders for their continued support and all the staff for their commitment, energy and passion without which we could not do the amazing things we have achieved.

Thank you.

**Lee Clarke  
General Manager**

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### Mission

- Forewind’s mission is to deliver development consents for safe, viable offshore wind capacity.
- Our priority is to secure the first six projects, each up to 1.2GW – to build momentum and confidence in Forewind.
- We aim to deliver and maximise value in the Dogger Bank development option on behalf of the parent companies.

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### Objectives

- Whatever the pressure, there is always time to operate safely – our objective is to be best in class.
- Forewind exists to deliver development consents.
- We always seek to maximise value for our owners.

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### Vision

We aim to be the most admired offshore wind development team in Europe.

- Reputation for quality, expertise and integrity – best in class in our industry.
- Continuously innovating to deliver the programme on time and on budget.
- Proud to be Forewind; recognised as the project colleagues and competitors would like to be part of.
- Our benchmark is offshore wind in general and Round 3 in particular.
- The biggest Round 3 project, capable of generating up to 10% of the UK’s electricity.
- Dogger Bank has a vital part to play in helping combat climate change by reducing carbon emissions.
- Committed to developing Dogger Bank, with the minimum environmental impact.
- Working together to achieve safe, technically and economically viable projects ready for construction.
- Building on the strengths of four of Europe’s biggest energy companies.
- Leadership in the development of renewables in the North Sea.



## Progress since April 2011

### A key to progressing the development of the Dogger Bank Zone this past 12 months was securing additional grid connection agreements with the National Grid.

The signing of 5GW of grid connection agreements built on the agreement signed in March 2010 for a 1GW connection into the existing Creyke Beck substation, north of the Humber Estuary in the East Riding of Yorkshire.

Of this year's signings, a further 1GW will connect into Creyke Beck.

The remaining 4GW of connection will be into sites in Teesside. Two will connect to an existing substation at Lackenby. The other two connections are likely to be at a new substation, which National Grid plans to build to replace an existing facility. The location of the new substation is likely to be in the industrial area south of the Tees Estuary and relatively close to Lackenby.

These agreements have enabled Forewind to proceed with the development of up to 7.2GW of offshore wind farm projects. This could feasibly generate as much green energy per year as the total amount of electricity used annually by homes and industry in Yorkshire and the Humber.

Forewind will develop these grid connections in two stages and work is now well progressed on:

- Dogger Bank Creyke Beck consisting of two wind farm projects
- Dogger Bank Teesside consisting of a maximum of four wind farm projects.

These grid connections have helped to confirm the Dogger Bank Zone as the world's largest offshore wind development.

**'With the Creyke Beck and Teesside grid connection agreements in place, we have been able to provide a lot more detail and certainty to our stakeholders, many of whom are now actively engaged with us on the development of the Dogger Bank projects.'**

**Nikki Smith**  
Stakeholder Manager

#### Milestones

The Zone Development Agreement between Forewind and The Crown Estate has a total of 70 contractual milestones spread over a five-year period. To the end of May 2012, more than half of those 70 milestones had been completed.

**'Everyone within the team has focused on ensuring we keep on track with our milestones and maintain dialogue with The Crown Estate on our progress.'**

**Ryan Trow**  
Commercial Manager

#### Health and safety

Forewind's mission relies on safe work and its objective states that there is always time to operate safely. Even with such ambitions, incidents have occurred and since April 2011, a total of 10 incidents have been recorded. The most serious of these were a falling wireline tool on a vessel in July and then in January 2012, on another vessel, a crewmember slipped and fell on an icy pontoon, but could potentially have fallen into the water.

These incidents have happened against a backdrop of almost 310,000 employee hours since April 2011.

Forewind works with its contractors to achieve high health and safety standards. Client representatives are on all vessels operating offshore, which has been an industry first for fish ecology surveys. Forewind has challenged the UK practice of using potent chemicals for cleaning benthic grabs, and substituted hazardous solvents with very mild detergents, in accordance with applicable ISO standards and Norwegian practice.

**'At Forewind we believe that excellent health and safety performance is necessary for commercial success.'**

**Matilda Machacek**  
Head of Operations and Safety



## Activities and achievements



### Zonal activity

Work has continued these past 12 months on the identification of the offshore sites for the individual wind farm projects which will each comprise: several hundred wind turbines, a number of offshore substations, a pair of export cables, and an onshore converter station with associated infrastructure. Exhaustive site and turbine array option modelling has resulted in numerous alternatives which will continue during 2012. Forewind's aim is to develop wind farm designs which allow the most efficient turbine capacity for a given grid connection capacity as well as an overarching optimal cost.

This past 12 months also saw the signing of a contract with Fred. Olsen United AS to design, construct and install the two meteorological masts and foundations at the site by late 2012.

Surveys continued throughout the period including the world's most comprehensive ornithological and marine mammal survey, which completed its second year and included a target of more than 2,400 line kilometres each month.

This year Forewind, in partnership with the Humberside Engineering Training Association, launched an innovative careers education programme called Champions for Wind to raise awareness amongst 13 to 14 year olds of the potential career opportunities in offshore wind. Teachers from 10 schools in Hull and East Riding were awarded bursaries to tailor resources on the topic to their own students as part of the first phase, with further schools being involved in 2012.

**'As the first stage of development, Dogger Bank Creyke Beck has been a steep learning curve but we are well on track with our Environmental Impact Assessment and planning our second phase of consultations.'**

**Gavin Clark**  
Yorkshire and Offshore Project Manager

### Dogger Bank Creyke Beck

Dogger Bank Creyke Beck will be the first stage of development in the Dogger Bank Zone. It will have an installed capacity of up to 2.4GW and will connect into the existing Creyke Beck substation near Cottingham, in the East Riding of Yorkshire. It will comprise up to two offshore wind farms, each with an installed capacity of up to 1.2GW.

Work on the Environmental Impact Assessment for Dogger Bank Creyke Beck, including surveys, studies and ongoing consultation continued this year with the planning application due for submission in early 2013.

The first phase of consultation began in December 2011 and presented two options for landfall and a number of potential sectors for the onshore converter stations location. Through the consultation, the southern landfall – between Barmston and Ulrome on the Holderness coast – was identified as preferred. A local working group was also initiated to help micro-site the converter stations.

On the Dogger Bank Zone and offshore cable route, all the necessary benthic, geotechnical and geophysical surveys were completed by March 2012.

Date	Activity
Q4 2011	First stage of statutory consultation
2011 – 2012	Environmental surveys and reporting
Q1 2013	Second stage of statutory consultation
Q2 2013	Submit application(s) for development consent order(s)
Q4 2014	Application(s) determined
2015 – 2017	Pre-construction phase
2016 – 2021	Construction
2017 onwards	Operation



**'The feedback received during the phase one consultation will provide valuable input to our on-going development process, particularly in relation to converter station siting.'**

**Mark Baxter**  
Teesside and Onshore Project Manager



### Dogger Bank Teesside

Dogger Bank Teesside will be Forewind's second stage of development and will consist of a maximum of four wind farm projects. Two of the projects are planned to connect at an existing substation in Lackenby, Teesside where Forewind has agreed connection points with National Grid. The other two wind farm projects are expected to connect at a new substation also likely to be sited in Teesside, however the location is to be finalised.

Dogger Bank Teesside formally kicked off in January 2012 and the first main milestone was reached the following month with the submission of the scoping report to the Infrastructure Planning Commission.

In April 2012, Forewind published its Statement of Community Consultation for the proposed development and its associated infrastructure to explain how it would consult with the local community including technical consultees and landowners, as well as others who work in or use the area, both offshore and onshore.

The first phase of consultation began in May 2012 to explain the site selection work done to date, including the results of initial ecological studies and the process to narrow down the locations of the offshore wind farms, landfalls and converter stations. Three possible landfall locations were presented including a preferred site on a 1.5km stretch of coastline between Redcar and Marske-by-the-Sea.

Date	Activity
Q2 2012	First stage of statutory consultation
2012 – 2013	Environmental surveys and reporting
Q3 2013	Second stage of statutory consultation
Q1 2014	Submit application(s) for development consent order
Q2 2015	Application(s) determined
2015 – 2017	Pre-construction phase
2016 – 2021	Construction
2017 onwards	Operation





## Engineering and supply chain

### Innovative foundation technology

Forewind will employ an innovative new foundation design concept for its two meteorological masts, having signed a contract with Fred. Olsen United AS to design, construct and install both the masts and foundations at the site by late 2012.

The met masts, which will monitor wave and wind conditions at Dogger Bank, and foundation design, known as a suction installed bucket, were identified as part of the Carbon Trust's collaborative Offshore Wind Accelerator programme, an initiative which aims to reduce the cost of offshore wind energy by 10 per cent via research, development and demonstration.

### Supply chain

Forewind has mapped the UK supply chain to have a clear understanding of the goods and services available and assess its capacity in line with the anticipated construction and operation and maintenance requirements for Dogger Bank. As developer, Forewind will not be responsible for these phases, but this work will ensure that the lead operators are fully aware of the market when they reach the stage of awarding contracts.

Meanwhile, Forewind has placed contracts valued at more than £20 million over the past 12 months. More than 40 separate consultancies and services providers, the majority UK-based, have been employed to provide a wide range of services.

**'Forewind's development work would not be possible without the expertise and input from our many contractors from the UK, as well as internationally.'**

**Gurpal Dhanda**  
Procurement Manager

## Grid

Having secured agreement with National Grid for connections totalling 6GW of capacity, work on the connections themselves continued throughout the period.

Electrical planning work on the two Dogger Bank Creyke Beck connections is well advanced in terms of converter station and onshore cable route selection. Work on Dogger Bank Teesside, comprising two connections at Lackenby and a further two connections close by on the Tees Estuary is also progressing with landfall and preferred onshore converter station sites identified.

Forewind continues to work with National Grid to determine the most economic and efficient connection solutions for further grid connections beyond the first six projects.

**'Both National Grid and Forewind worked extremely hard on reaching agreement, which demonstrates our ambitions and the appetite of our parent companies to take these projects forward.'**

**David Flood**  
Head of Electrical Systems

## Calendar of highlights

### 2011

#### May

Offshore bird survey data was presented to the RSPB and JNCC at a workshop and results demonstrated that for most species combining boat and aerial data was statistically robust.

The benthic survey campaign started.

Fraisthorpe to Ulrome area selected for the landfall location for Dogger Bank Creyke Beck.

#### June

Concept engineering phase for the met mast was completed.

The benthic survey campaign in Tranche A finished all camera work.

Geophysical surveys on the offshore section of the Dogger Bank Creyke Beck cable corridor were completed.

The Passive Acoustic Monitoring Systems (PAMS) were demobilised from the *Vigilant* after 17 months of operation.

#### July

A serious incident occurred on board one vessel involving a falling wire line tool. Forewind initiated its own investigation.

A laser wind-profiling instrument to provide measured wind data (LIDAR) was deployed on the Cavendish gas platform near the zone.

A seismic anomaly investigation was completed and a total of 15 locations were drilled. No free gas was discovered.

#### August

The project boundary optimisation work started.

#### September

A number of offshore surveys were completed including the near shore fish ecology survey, a pelagic fish survey and intertidal surveys at the landfall for Dogger Bank Creyke Beck.

#### October

The second fish ecology campaign was relaunched.

An EPCI contract for two met masts was successfully signed with Fred. Olsen United.

The preparation of the first tranche of Preliminary Environmental Information (PEI1) continued ready for consultation and public exhibitions in December for Forewind's first two projects connecting into Creyke Beck substation near Hull.

#### November

Grid connection agreements were signed with National Grid for two further projects taking the total transmission capacity secured to 3GW.

An update to the shallow gas Safety Bulletin was issued to the industry.

The Dogger Bank Creyke Beck Statement of Community Consultation and Preliminary Environmental Information 1 documents were published.

#### December

Completion of a large number of turbine array models with the focus primarily on perimeter arrays and block arrays.

JNCC, Natural England and RSPB gave positive verbal confirmation of bird survey methods employed.

Five public exhibitions were held in various locations in East Riding of Yorkshire as part of the first phase of consultation for Dogger Bank Creyke Beck.

### 2012

#### January

Most of the offshore surveys for Dogger Bank Creyke Beck were completed as well as Preliminary Environmental Information 1 and the consultation phase.

#### February

Grid connection agreements were signed with National Grid for three further projects, taking the total transmission capacity secured to 6GW.

It was agreed the first six projects would be up to 1.2GW each.

Kick off meeting with the ten teachers nominated as 'wind energy champions' as part of Forewind's Champions for Wind educational careers initiative.

#### March

Another fish ecology survey started.

The first meeting of the Dogger Bank Creyke Beck Community Working Group was held.

#### April

The landfall location for Dogger Bank Creyke Beck was finalised following surveys, research and feedback from stakeholders.

The initial onshore ecology surveys for Dogger Bank Teesside got underway.

Section 53 licences were granted and access to land achieved for surveys for Dogger Bank Creyke Beck.

First edition of *Dogger Bank News* was published and distributed to 2,000 stakeholders.

#### May

The Dogger Bank Teesside Statement of Community Consultation and Preliminary Environmental Information 1 documents, including the scoping report, were published.

Three public exhibitions were held as part of phase one consultation for Dogger Bank Teesside.

## Future

Over the coming 12 months Forewind expects to successfully install the meteorological masts and demonstrate innovation in action with the suction installed bucket technology. The final development tranche will be identified as well as the optimal wind farm layouts for wind farms planned for the first two development tranches.

This time next year, the organisation will have submitted its first development consent order application – or applications – for Dogger Bank Creyke Beck and be well on its way to submitting the same for Dogger Bank Teesside.

Meanwhile the team will continue to focus on health and safety as a priority, while working to secure the first six projects and aim to ensure the optimal value in the Dogger Bank development option on behalf of its four parent companies.

**'What Forewind has done with its approach to surveys is clearly exemplary in many ways** and will result in a substantial legacy in knowledge and data, while also contributing hugely to de-risking the future developments on Dogger Bank.'

**Prof. Mike Cowling**  
Chief Scientist, The Crown Estate



Fishing pots at Redcar,

### Photo captions

**Front cover**  
Sheringham Shoal Offshore Wind Farm

**Contents/inside back cover**  
Installation of a turbine blade

**Introduction**  
Wave buoy recovery on the MV Forth Hunter at Dogger Bank

**Pages 4/5**  
Beach huts at Whitby, south of the proposed landfall for Dogger Bank Teesside

**Page 6**  
**(top)** Gannets 'surfing' on Dogger Bank  
**(bottom)** Redcar beach, site of the preferred landfall for Dogger Bank Teesside

**Page 7**  
An installed Siemens 3.6MW wind turbine

**Page 8**  
**(top)** A meeting of the Dogger Bank Creyke Beck Community Working Group  
**(bottom)** Herring Gull observed at Dogger Bank

**Page 9**  
**(left, top – bottom)** Great Black-backed Gull photographed as part of ornithological survey  
Public consultation event for Dogger Bank Teesside  
Harbour seal seen at Dogger Bank  
Foundation installation  
**(bottom right)** Fishing pots at Redcar, Teesside

**Page 10**  
**(top)** LIDAR installed on Cavendish gas platform  
**(bottom)** Contractors deploying a seabed video camera on Dogger Bank

**This page**  
Transition pieces awaiting installation

